

CLAIMS

What is claimed is:

1. A particle accelerator comprising:

an injector for generating charged particles;

5 an electromagnetic drive subsystem for generating pulses of electromagnetic waves;

a first accelerating section adapted to receive said electromagnetic waves and to transfer energy from said electromagnetic waves to said charged particles as said charged particles travel therethrough;

10 a second accelerating section adapted to transfer energy to said charged particles as said charged particles travel therethrough;

a waveguide connected to said electromagnetic drive subsystem and adapted to deliver said electromagnetic waves from said electromagnetic drive subsystem to said first accelerating section, said waveguide being at least partially physically interposed between
15 said first accelerating section and said second accelerating section; and,

a tube connected to and extending between said first accelerating section and said second accelerating section, said tube being adapted to enable said charged particles to travel between said first accelerating section and said second accelerating section.

20 2. The particle accelerator of Claim 1, wherein said waveguide has a wall and said tube is formed within said wall.

3. The particle accelerator of Claim 1, wherein said waveguide is a first waveguide and said particle accelerator further comprises a second waveguide connected to said
25 electromagnetic drive subsystem; said second waveguide being at least partially physically interposed between said first accelerating section and said second accelerating section.

4. The particle accelerator of Claim 3, wherein said first waveguide and said second waveguide share a common wall therebetween.

30 5. The particle accelerator of Claim 4, wherein said tube is defined within said shared common wall.

6. A particle accelerator comprising:

an injector for generating charged particles;

a radio frequency generator for generating pulses of electromagnetic waves;

a first accelerating section adapted to receive said electromagnetic waves and

5 to transfer energy from said electromagnetic waves to said charged particles as said charged particles travel therethrough, said first accelerating section defining a longitudinal axis thereof;

a second accelerating section adapted to transfer energy to said charged particles as said charged particles travel therethrough;

10 a 3dB waveguide hybrid junction having a first waveguide and a second waveguide sharing a common wall therebetween, said wall defining a coupling window therein, said first waveguide defining a longitudinal axis thereof substantially perpendicular to said longitudinal axis of said first accelerating section, said first waveguide being connected to said first accelerating and said second waveguide being connected to said
15 second accelerating section, said first waveguide being connected to said radio frequency generator; and,

a shorting waveguide connected to said first waveguide of said 3dB waveguide hybrid junction and having a shorting device therein positioned such that said longitudinal axis of said first accelerating section is substantially between said shorting
20 device and said coupling window.

7. The particle accelerator of Claim 6, wherein said common wall comprises a first narrow wall of said first waveguide of said 3dB waveguide hybrid junction and said 3dB waveguide hybrid junction further comprises a second narrow wall opposing said first narrow wall, a first wide wall, and a second wide wall opposing said first wide wall.
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